

Hiroko IWASAKI, S.N. 09/836,144  
Page 7 of 14

Dkt. No. 2271/50717-AY

**REMARKS**

The application has been reviewed in light of the Office Action dated July 27, 2007. Claims 12, 16-21 and 24-27 are pending in this application, with claims 1-11, 13-15, 22 and 23 having previously been canceled, without prejudice or disclaimer. By the present Amendment, claims 12, 16, 18-21, 24 and 26 have been amended to more clearly point out the claimed subject matter. Accordingly, claims 12, 16-21 and 24-27 are presented for reconsideration.

Claims 24-27 were rejected under 35 U.S.C. §112, second paragraph, as allegedly indefinite.

By this Amendment, claims 24 and 26 have been amended to clarify the claimed subject matter.

Withdrawal of the rejection under 35 U.S.C. §112 is requested.

Claims 12, 16-21 were rejected under 35 U.S.C. §103(a) as purportedly unpatentable over U.S. Patent No. 4,902,584 to Uchiyama et al., in view of U.S. Patent 4,983,505 to Higuchi et al., and further in view of U.S. Patent 5,156,693 to Ide et al. Claims 12, 16 and 18-21 were rejected under 35 U.S.C. §103(a) as purportedly unpatentable over Uchiyama in view of Higuchi, and further in view of Ide and further in view of either one of JP 5-135409 (JP '409) or EP 0569664 (EP '664). Claims 12, 16, 18-21 and 24-27 were rejected under 35 U.S.C. §103(a) as purportedly unpatentable over Ide in view of Sawamura and further in view of either one of JP5-135409 or EP0569664.

Applicant submits that independent claims 12 and 16 are patentable over the cited references because, *inter alia*, the cited references, taken singly or in combination, do not teach or suggest an optical phase variation type data recording medium wherein a first protection layer is configured to have a thermal conductivity matching the light-to-heat conversion efficiency of

Hiroko IWASAKI, S.N. 09/836,144  
Page 8 of 14

Dkt. No. 2271/50717-AY

the phase-variation type recording layer.

As previously pointed out in the record, the subject matter of this application is an optical phase variation type data recording medium wherein data are recorded on such medium by forming amorphous portions on the phase variation type recording layer, and the data are read from the recording layer by applying a coherent light beam and determining transitions between the amorphous portions and crystalline portions on the recording layer from respective light reflected from the amorphous portions and from the crystalline portions.

In contrast, Uchiyama and Sawamura are directed to magneto-optical recording medium in which recording and readback do not operate in the same manner as optical phase variation type data recording medium.

In magneto-optical recording media, recording is performed by changing the direction of magnetization of a recording layer by irradiating a light beam and applying a magnetic field. The magneto-optical process involves the use of laser beams irradiated on the surface of the recording layer. Recording is achieved when the laser beam increases the temperature of a spot on the recording layer above its Curie point which causes the effected spot to lose its pre-magnetization or sensitizing it to a recording magnet field when it cools. Therefore, the recording surface must consist of an element with a Curie point, which is a magnetic property. Although the recording layer in a magneto-optical recording medium can include phase conversion type materials, such materials are used because the different phases have different magnetic property, and data is encoded in such a recording layer by direction of magnetization. The relevant properties of the recording layer material are Kerr rotation angle and Curie point, both of which are magnetic properties.

Readback from magneto-optical media is not obtained by determining transitions

Hiroko IWASAKI, S.N. 09/836,144  
Page 9 of 14

Dkt. No. 2271/50717-AY

between amorphous portions and crystalline portions on the recording layer, but rather by changes in polarization of a light beam when subjected to a magnetic field. The Faraday effect rotates the polarization of a transmitted light beam while the Kerr effect operates on a reflected beam. Applicant respectfully points out that both the Faraday and Kerr effects are magnetic properties, and that the Faraday effect is a result of ferromagnetic resonance.

It should be noted that in a magneto-optical medium, both the recording process and the readback process are dependant on a ferromagnetic recording layer, as the Curie temperature represents the temperature at which a ferromagnetic material becomes a paramagnetic material and the Faraday effect depends on ferromagnetic resonance. Applicant respectfully points out that a ferromagnetic substance is a material which exhibits a positive magnetic susceptibility in both the presence of a magnetic field and in the absence of a magnetic field, while a paramagnetic substance is one which exhibits a positive magnetic susceptibility only in the presence of a magnetic field but not in the absence of an external magnetic field. Thus a ferromagnetic recording layer is required for the magneto-optical recording process in order to be able to manipulate the magnetization of the recording film.

Sawamura and Uchiyama each teaches a magneto-optical recording medium that comprises a ferromagnetic recording layer. For example, the GdTbFe and GdTbFeCo recording layers, described by Sawamura, are ferromagnetic. Sawamura limits its description of a recording layer to a "recording magnetic layer." (see Sawamura, column 2, line 40). Sawamura proposes use of a protective layer comprising a nitride-oxide mixture to obtain a desired refractive index and other properties suitable for writing to and reading from a magnetic recording layer.

Uchiyama also limits its description of a recording layer to a "magnetic thin-film layer"

Hiroko IWASAKI, S.N. 09/836,144  
Page 10 of 14

Dkt. No. 2271/50717-AY

and teaches preferred embodiments of a magnetic thin-film layer comprised of 65 to 85 atom percents of Fe and Co in total, both of which are ferromagnetic elements (see Uchiyama, column 6, lines 35-51). Uchiyama proposes use of a protective layer comprising a combination of silicon oxide and silicon nitride in order to enhance corrosion resistance of the recording layer and enhance adhesion of the recording layer to a substrate.

However, neither Sawamura nor Uchiyama teaches or suggests that the protective layer should be configured to have a thermal conductivity matching the light-to-heat conversion efficiency of the phase-variation type recording layer.

The remaining cited references likewise do not disclose or suggest such features of the claimed subject matter of independent claims 12 and 16 of the present application.

Ide proposes an optical recording medium including a recording layer that consists of Ag, In, Sb and Te, each of which are non-ferromagnetic elements that are characterized as non-magnetic/diamagnetic elements.

Due to the fact that the recording layer described in Ide is non-ferromagnetic, it is unsuitable for utilization in the magneto-optical recording media described by Sawamura and Uchiyama because recording and readback would not be possible with such a recording layer. A non-ferromagnetic recording layer has no Curie point (thus magneto-optical recording is not possible), also a non-ferromagnetic recording layer does not induce a faraday effect on light that transmits through it or a Kerr effect on light that reflects from it (thus magneto-optical readback is not possible).

Therefore, if one combines the recording layer taught in Ide with the magneto-optical recording medium taught in either Uchiyama or Sawamura the result is an magneto-optical recording medium that is unable to record on its recording layer and unable to read from its

Hiroko IWASAKI, S.N. 09/836,144  
Page 11 of 14

Dkt. No. 2271/50717-AY

recording layer.

Accordingly, one skilled in the art would not have looked to Uchiyama and Sawamura when the subject matter is an optical phase variation type data recording medium wherein data are recorded on such medium by forming amorphous portions on the phase variation type recording layer by heating the recording layer to above its melting point and cooling it at a sufficiently high speed, and the data are read from the recording layer by applying a coherent light beam and determining transitions between the amorphous portions and crystalline portion on the recording layer from respective light reflected from the amorphous portions and from the crystalline portions (which Uchiyama and Sawamura do not teach or suggest).

Further, although each of Uchiyama and Sawamura proposes various protective layer materials that are purportedly sufficiently durable and corrosion resistant for a magneto-optical recording medium, neither Uchiyama nor Sawamura teaches or suggests that such protective layer materials are suitable for an optical phase variation type data recording medium wherein data are recorded on such medium by forming amorphous portions on the phase variation type recording layer, and the data are read from the recording layer by applying a coherent light beam and determining transitions between the amorphous portions and the crystalline portions on the recording layer from respective light reflected from the amorphous portions and from the crystalline portions.

More specifically, with regards magnetizable thin recording layers, Uchiyama describes that (see Uchiyama column 1, lines 33-43):

"Magneto-optical recording media having such amorphous perpendicular magnetizable thin film...have a storage problem. If the magnetic thin film layers are stored in the ambient atmosphere [they] are eroded or oxidized by oxygen...losing the necessary information recording and reproducing ability."

Hiroko IWASAKI, S.N. 09/836,144  
Page 12 of 14

Dkt. No. 2271/50717-AY

Thus, Uchiyama proposes using a protective layer that is sufficient in moisture protection and adhesion.

Higuchi describes that a problem with rare earth/transition metals (citing Gb, Dy, Fe, Co and Ni, each of which are ferromagnetic elements) is that:

"... they are highly susceptible to oxidation and that their magnetic characteristics, such as coercive force, will decrease upon oxidation. This causes time-dependent deterioration in the characteristics of magneto-optical recording media. Therefore, preventing oxidation of the recording layer made of [such metals] has been one of the major requirements to be met to...improve the long term reliability of their performance."

Higuchi notes that the concerns within the magneto-optical recording medium and phase-change recording medium fields differ. Higuchi states that deterioration due to aerial oxygen or moisture is not as serious a problem with phase-change recording media as it is with magneto-optical media. The specification of the present invention describes that, in phase-change recording media, a major concern is the accumulation of excessive heat in the recording layer which makes it difficult to set up the cooling speed high enough for the formation of amorphous and results in unnecessary use of excess power as well as heat damage to the interfaces between consecutive layers of the phase-change recording medium.

Therefore, because of the differing concerns between the phase-change and opto-magnetic recording media, no motivation exists to combine a protection layer designed to prevent the oxidation of ferromagnetic metals in order to preserve said metals' magnetic characteristics to a recording medium in which the major concern is the accumulation of heat in a recording layer comprised of non-ferromagnetic metals that exhibit no positive magnetic susceptibility.

Accordingly, applicant maintains that it would not have been obvious to combine

Hiroko IWASAKI, S.N. 09/836,144  
Page 13 of 14

Dkt. No. 2271/50717-AY

Uchiyama or Sawamura with Ide.

Ide, as previously pointed out in the record, proposes a phase-change type of optical recording medium including a heat-resistance protective layer, but does not teach or suggest use of a protection layer constituted by  $\text{SiO}_2$  as a basic material, and a compound having a thermal conductivity greater than or equal to 10 W/m.deg when in a bulk state, and comprising silicon nitride in a molar ratio with the basic material of 10% to 85% silicon, as provided by the subject matter of independent claims 12 and 16.

The cited art simply does not teach or suggest an optical phase variation type data recording medium comprising a reflective heat radiation layer, a first protection layer, a phase variation type recording layer consisting mainly of Ag, In, Sb and Te, wherein the first protection layer comprises  $\text{SiO}_2$  as a basic material, and a compound having a thermal conductivity greater than or equal to 10 W/m.deg when in a bulk state, the compound comprising silicon nitride in a molar ratio with the basic material of 10% to 85% silicon nitride, wherein the thermal conductivity of the first protection layer is greater than a thermal conductivity of the second protection layer, and wherein the protection layer is configured to have a thermal conductivity matching the light-to-heat conversion efficiency of the phase-variation type recording layer, as provided by the subject matter of independent claims 12 and 16 of the present application.

Accordingly, for at least the above-stated reasons, Applicant respectfully submits that independent claims 12 and 16, and the claims depending therefrom, are patentable over the cited art.

In view of the remarks hereinabove, Applicant submits that the application is now in condition for allowance, and earnestly solicits the allowance of this application.

If a petition for an extension of time is required to make this response timely, this paper

Hiroko IWASAKI, S.N. 09/836,144  
Page 14 of 14

Dkt. No. 2271/50717-AY

should be considered to be such petition. The Office is hereby authorized to charge any fees that are required in connection with this amendment and to credit any overpayment to our Deposit Account No. 03-3125.

If a telephone interview could advance the prosecution of this application, the Examiner is respectfully requested to call the undersigned attorney.

Respectfully submitted



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